

Appendix D
Agreement for Southern California Cooperative
Stormwater Research/Monitoring Program

COOPERATIVE AGREEMENT TO ESTABLISH A SOUTHERN CALIFORNIA STORMWATER
RESEARCH/MONITORING PROGRAM

THIS AGREEMENT, for purposes of identification numbered D99-072, is made and entered into this ____ day of _____, _____, by and between the County of Orange, the County of Los Angeles, the County of San Diego, the Ventura County Flood Control District, the Riverside County Flood Control and Water Conservation District, the San Bernardino County Flood Control District, the City of Long Beach, the California Regional Water Quality Control Board, Los Angeles Region, the Regional Water Quality Control Board, Santa Ana Region, the Regional Water Quality Control Board, San Diego Region, and the Southern California Coastal Waters Research Project (SCCWRP). These entities are hereinafter sometimes jointly referred to as the "PARTIES" and individually as "PARTY".

WITNESSETH

WHEREAS, Section 402 of the Clean Water Act (33 U.S.C.A. 1342(p)) contains regulations for applications for municipal and industrial stormwater discharge permits; and

WHEREAS, these permit regulations require the control of pollutants from stormwater discharges by requiring a National Pollutant Discharge Elimination System (NPDES) permit to allow the lawful discharge of stormwater into waters of the United States; and,

WHEREAS, in Southern California NPDES stormwater permits have been issued by the Los Angeles, San Diego and Santa Ana Regional Water Quality Control Boards in the counties of Los Angeles, Orange, Riverside, San Bernardino, San Diego and Ventura naming the counties, cities and flood control districts as co-permittees; and,

WHEREAS, the counties or districts that are PARTIES to this AGREEMENT are acting on behalf of the co-permittees with respect to their countywide NPDES stormwater permit pursuant to local agreements; and

WHEREAS, the City of Long Beach has received an individual NPDES stormwater permit from the California Regional Water Quality Control Board, Los Angeles requiring

1 a monitoring component that will be partially satisfied by participation in this
2 AGREEMENT; and

3 WHEREAS, all the NPDES stormwater permits issued to the PARTIES have
4 requirements for extensive monitoring; and

5 WHEREAS, the NPDES stormwater permits issued in the counties of Orange,
6 Riverside, San Bernardino and Ventura encourage inter-county cooperation in
7 monitoring; and

8 WHEREAS, many of the scientific and technical tools for such stormwater
9 monitoring cooperation are inadequately developed; and

10 WHEREAS, the PARTIES agree that a cooperative research/monitoring program should
11 be established to develop the methodologies and assessment tools to more effectively
12 understand urban stormwater and non-stormwater (anthropogenic) impacts to receiving
13 waters; and

14 WHEREAS, the PARTIES agree that some monies currently directed to NPDES
15 compliance monitoring may be appropriately directed to support this research effort;
16 and

17 WHEREAS, the SCCWRP, a Joint Powers Authority, was established in 1969 and is
18 governed by the City of Los Angeles, the Los Angeles County Sanitation Districts, the
19 City of San Diego, the Orange County Sanitation District, the Los Angeles, San Diego
20 and Santa Ana Regional Water Quality Control Boards, the State Water Resources Control
21 Board and the United States Environmental Protection Agency Region IX; and

22 WHEREAS, the mission of the SCCWRP is to contribute to the scientific
23 understanding of linkages among human activities, natural events and the health of the
24 southern California coastal environment, and whose goal is to develop, participate in
25 and coordinate programs to further this mission; and

26 WHEREAS, the SCCWRP has agreed to provide its scientific and technical
coordination resources to support this research effort; and

WHEREAS, the development of a research agenda has been identified as the first
work task in creating a cooperative research program; and

WHEREAS, the University of California, other research institutions and specialized consulting companies may play a significant role in developing the research agenda and completing selected research elements:

NOW, THEREFORE, IT IS AGREED by and between the PARTIES hereto as follows:

Section 1. PURPOSE. This AGREEMENT is entered into for the purpose of supporting the formation of a Cooperative Stormwater Research/Monitoring Program ("PROGRAM") in Southern California. The key focus of the PROGRAM is to develop the methodologies and assessment tools to more effectively understand urban stormwater and non-stormwater (anthropogenic) impacts to receiving waters. This AGREEMENT includes an initial task to develop and prioritize a research agenda and provides for separate, subsequent research implementation agreements ("SUBSEQUENT RESEARCH IMPLEMENTATION AGREEMENTS") to fund recommended research studies.

Section 2. TERM. The term of this AGREEMENT shall commence upon approval and execution of this document by the last signatory to this AGREEMENT and shall continue for a period of five (5) years from that date but shall not extend beyond October 1, 2005.

Section 3. STEERING COMMITTEE. Each PARTY shall appoint a member and an alternate to a Steering Committee. The members shall elect a chair to serve a one-year term. The Steering Committee shall meet from time to time upon the request of the chair, but at least every six months. The Steering Committee shall be responsible for overseeing the development and prioritization of a research agenda and the preparation and oversight of SUBSEQUENT RESEARCH IMPLEMENTATION AGREEMENTS to fund recommended research studies. The Steering Committee shall prepare an annual report for the PARTIES by October 1 of each year, describing the progress made in the prior year ending June 30.

Section 4. ADDITIONAL PARTIES. It is recognized that there may be other parties who wish to participate in and provide funding for the PROGRAM. Nothing in this AGREEMENT is intended to preclude additional participants being added by written amendment as parties to this AGREEMENT pursuant to Section 10.

1 Section 5. DEVELOPMENT AND PRIORITIZATION OF A RESEARCH AGENDA. SCCWRP is
2 designated as the Lead Agency for the development and prioritization of a stormwater
3 research agenda. As Lead Agency, SCCWRP shall coordinate all portions of the scope of
4 work described in Exhibit A, oversee any contractors selected, collect funds from the
5 PARTIES, provide progress reports to the Steering Committee on the work completed and
6 the monies expended, and perform other administrative functions necessary to ensure
7 the preparation of the research agenda. Exhibit A is attached hereto and made a part
8 hereof.

9 Section 6. FUNDING. Exhibit B, which is attached hereto and made a part hereof,
10 describes the cost share allocations for the PARTIES for the development and
11 prioritization of the stormwater research agenda.

12 Section 7. PAYMENT. The PARTIES will make payment of the full amount of
13 their respective cost share allocation described in Exhibit B to SCCWRP within sixty
14 (60) days of the approval date of this AGREEMENT. At the completion of the work
15 described in Exhibit A, SCCWRP will provide a final written accounting of expenditures
16 to each of the PARTIES for completing the stormwater research agenda. If the
17 expenditures are less than the cost share payments made by the PARTIES, SCCWRP shall
18 reimburse to each PARTY its prorated share of the excess within forty-five (45) days
19 of the final accounting.

20 Section 8. SUBSEQUENT RESEARCH IMPLEMENTATION AGREEMENTS. Implementation of the
21 stormwater research agenda shall be accomplished through SUBSEQUENT RESEARCH
22 IMPLEMENTATION AGREEMENTS, which shall be prepared by the Steering Committee. These
23 agreements shall designate a lead agency and shall provide for funding to complete the
24 research study, which may involve different cost share allocations from those included
25 in this AGREEMENT. The PARTIES to this AGREEMENT as well as other parties not
26 signatory to this AGREEMENT may, by written agreement, become participants in these
SUBSEQUENT RESEARCH IMPLEMENTATION AGREEMENTS.

Section 9. GRANTS. All PARTIES shall use their best efforts to obtain grants to supplement the funding for the SUBSEQUENT RESEARCH IMPLEMENTATION AGREEMENTS.

Section 10. REGULATORY RESPONSIBILITIES AND OBLIGATIONS. It is mutually understood and agreed that, merely by entering into this AGREEMENT, the regulatory responsibilities and obligations of each PARTY are in no manner modified. Any such responsibilities and obligations remain the same, while this AGREEMENT is in force, as they were before this AGREEMENT was made.

Section 11. AMENDMENT. This AGREEMENT may be amended upon the written approval of all of the PARTIES.

Section 12. LIABILITY. It is mutually understood and agreed that, merely by the virtue of entering into this AGREEMENT, each PARTY neither relinquishes liability for its own action nor assumes liability for the actions of other PARTIES. It is the intent of the PARTIES that liability of each PARTY shall remain the same, while this AGREEMENT is in force, as it was before this AGREEMENT was made. Liability provisions in SUBSEQUENT RESEARCH IMPLEMENTATION AGREEMENTS shall be addressed separately in each such agreement.

Section 13. TERMINATION. Any PARTY wishing to terminate its participation in this AGREEMENT shall provide ninety (90) days written notice to all the other PARTIES of its intent to withdraw. Such termination shall be effective ninety (90) days after the notice is received or deemed received ("EFFECTIVE DATE OF TERMINATION"). The terminating PARTY shall continue to be responsible for its share of the financial obligations incurred up to the EFFECTIVE DATE OF TERMINATION as described in (a) and (b) below:

- a) the cost share allocations described in Exhibit B to this AGREEMENT; and
- b) the funding commitments, if any, in SUBSEQUENT RESEARCH IMPLEMENTATION AGREEMENTS.

The remaining PARTIES may continue in the performance of the terms and conditions of this AGREEMENT and SUBSEQUENT RESEARCH IMPLEMENTATION AGREEMENTS on the basis of a

1 revised allocation of the costs in Exhibit B and in SUBSEQUENT RESEARCH IMPLEMENTATION
2 AGREEMENTS or may elect to terminate the AGREEMENT and SUBSEQUENT RESEARCH
3 IMPLEMENTATION AGREEMENTS.

4 Section 14. AVAILABILITY OF FUNDS. The obligation of each PARTY is subject to
5 the availability of funds appropriated for this purpose, and nothing herein shall be
6 construed as obligating the PARTIES to expend or as involving the PARTIES in any
7 contract or other obligation for the future payment of money in excess of
8 appropriations authorized by law.

9 Section 15. NO THIRD PARTY BENEFICIARIES. Nothing expressed or mentioned in this
10 AGREEMENT is intended or shall be construed to give any person, other than the PARTIES
11 hereto, and any permitted successors, any legal or equitable right, remedy or claim
12 under or in respect of this AGREEMENT or any provisions herein contained. This
13 AGREEMENT and any conditions and provisions hereof is intended to be and is for the
14 sole and exclusive benefit of the PARTIES hereto and the others mentioned above, and
15 for the benefit of no other person.

16 Section 16. REFERENCE TO CALENDAR DAYS. Any reference to the word "day" or
17 "days" herein shall mean calendar day or calendar days, respectively, unless otherwise
18 expressly provided.

19 Section 17. ATTORNEYS FEES. In any action or proceeding brought to enforce or
20 interpret any provision of this AGREEMENT, or where any provision hereof is validly
21 asserted as a defense, each PARTY shall bear its own attorneys' fees and costs.

22 Section 18. ENTIRE AGREEMENT. This AGREEMENT is intended by the PARTIES as a
23 final expression of their agreement and intended to be a complete and exclusive
24 statement of the agreement and understanding of the PARTIES hereto in respect of the
25 subject matter contained herein. There are no restrictions, promises, warranties or
26 undertakings, other than those set forth or referred to herein. This AGREEMENT

supersedes all prior agreements and understandings between the PARTIES with respect to such matter.

Section 19. SEVERABILITY. If any part of this AGREEMENT is held, determined or adjudicated to be illegal, void, or unenforceable by a court of competent jurisdiction, the remainder of this AGREEMENT shall be given effect to the fullest extent reasonably possible.

Section 20. SUCCESSORS AND ASSIGNS. The terms and provisions of this AGREEMENT shall be binding upon and inure to the benefit of the PARTIES hereto and their successors and assigns.

Section 21. NOTICES. All notices required or desired to be given under this AGREEMENT shall be in writing and (a) delivered personally, or (b) sent by certified mail, return receipt requested or (c) sent by telefacsimile communication followed by a mailed copy, to the addresses specified below, provided each PARTY may change the address for notices by giving the other PARTIES at least ten (10) days written notice of the new address. Notices shall be deemed received when actually received in the office of the addressee or when delivery is refused, as shown on the receipt of the U.S. Postal service, or other person making the delivery, except that notices sent by telefacsimile communication shall be deemed received on the first business day following delivery.

Director, PFRD
County of Orange
P.O. Box 4048
Santa Ana, CA 92702-4048

Director of Public Works
County of Ventura
800 S. Victoria
Ventura, CA 93009

Director of Public Works
County of Los Angeles
900 S. Fremont Ave.
Alhambra, CA 91803

General Manager-Chief Engineer
Riverside County FC&WCD
1995 Market St.
Riverside, CA 92501

Director
San Diego County Env. Health
P.O. Box 19269
San Diego, CA 92112-9261

Director,
Dept of Public Works
County of San Bernardino
825 E. 3rd Street
San Bernardino, CA 92415-0835

Director of Public Works
City of Long Beach
333 W. Ocean Blvd.
Long Beach, CA 90802

Executive Officer
Santa Ana RWQCB
3737 Main St., Suite 500
Riverside, CA 92501

Executive Officer
Los Angeles RWQCB
320 W. 4th St., Suite 200
Los Angeles, CA 90013

Executive Officer
San Diego RWQCB
9771 Clairmont Mesa Blvd. #A
San Diego, CA 92124

Executive Director
SCCWRP
7171 Fenwick Lane
Westminster, CA 92683

Section 22. OWNERSHIP OF DOCUMENTS. Upon completion of each written task deliverable described in Exhibit A, SCCWRP shall provide each of the PARTIES with a copy of the work product. The PARTIES, individually or jointly, shall not be limited in any way in their use of all data in the work product, including but not limited to reports, files, plans, drawings, specifications, proposals, sketches, diagrams and calculations, provided that any such use not within the purposes of this AGREEMENT shall be at the sole risk of the PARTY making that use. Ownership of documents prepared pursuant to SUBSEQUENT RESEARCH IMPLEMENTATION AGREEMENTS shall be addressed separately in each such agreement.

Section 23. EXECUTION OF AGREEMENT. This AGREEMENT may be executed in counterpart and the signed counterparts shall constitute a single instrument.

1 IN WITNESS WHEREOF, the PARTIES hereto have executed this AGREEMENT on the dates
2 opposite their respective signatures:

3
4 COUNTY OF ORANGE
5 A political subdivision of the State of
6 California

7 Date: _____

8 By _____
9 Chairman of the Board of Supervisors

10 SIGNED AND CERTIFIED THAT A COPY OF
11 THIS AGREEMENT HAS BEEN DELIVERED TO
12 THE CHAIRMAN OF THE BOARD

13 Date: _____

14 By _____
15 DARLENE J. BLOOM
16 Clerk of the Board of Supervisors of
17 Orange County, California

18 APPROVED AS TO FORM
19 LAURENCE M. WATSON
20 COUNTY COUNSEL

21 By _____
22 Deputy

23 Date: _____
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COUNTY OF LOS ANGELES
A political subdivision of the State of
California

Date: _____

By _____
Chairman of the Board of Supervisors

ATTEST:

Date: _____

By _____

Clerk of the Board of Supervisors of
Los Angeles County, California

APPROVED AS TO FORM
COUNTY COUNSEL

By _____
Deputy

Date: _____

COUNTY OF SAN DIEGO
A political subdivision of the State of
California

Date: _____

By _____
Chairman of the Board of Supervisors

ATTEST:

Date: _____

By _____

Clerk of the Board of Supervisors of
San Diego County, California

APPROVED AS TO FORM
COUNTY COUNSEL

By _____
Deputy

Date: _____

VENTURA COUNTY FLOOD CONTROL DISTRICT
A body corporate and politic

Date: _____

By _____
Chair of the Board of Supervisors of the
Ventura County Flood Control District

ATTEST:

Date: _____

By _____
Clerk of the Board of Supervisors of
Ventura County, California and ex-officio
Clerk of the Board of the Ventura County
Flood Control District

APPROVED AS TO FORM
COUNTY COUNSEL

By _____
Deputy

Date: _____

1 RIVERSIDE COUNTY FLOOD CONTROL AND WATER
2 CONSERVATION DISTRICT
3 A body corporate and politic

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5 RECOMMENDED FOR APPROVAL:

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DAVID P. ZAPPE
General Manager-Chief Engineer

APPROVED AS TO FORM:

WILLIAM C. KATZENSTEIN
County Counsel

By
JOE S. RANK
Assistant County Counsel

RIVERSIDE COUNTY FLOOD CONTROL AND WATER
CONSERVATION DISTRICT
A body corporate and politic

By
JAMES A. VENABLE, Chairman
Riverside County Flood Control and Water
Conservation District Board of Supervisors

ATTEST:

GERALD A. MALONEY
Clerk of the Board

Date: _____

By _____
Deputy

SAN BERNARDINO COUNTY FLOOD CONTROL DISTRICT
A body corporate and politic

Date: _____

By: _____
JOHN D. MIKELS,
Chairman, Board of Supervisors

SIGNED AND CERTIFIED THAT A COPY OF THIS
DOCUMENT HAS BEEN DELIVERED TO THE CHAIRMAN OF
THE BOARD:

Clerk of the Board of Supervisors of the County
of San Bernardino

By: _____
Deputy

APPROVED AS TO LEGAL FORM
ALAN K. MARKS
County Counsel

By: _____
CHARLES S. SCOLASTICO
Deputy County Counsel

Date: _____

CITY OF LONG BEACH, a municipal corporation

Date: _____

By: _____
City Manager

The foregoing Agreement is hereby approved as to form this _____ day of
_____, 2000.

ROBERT E. SHANNON, City Attorney

By: _____
Deputy

1 REGIONAL WATER QUALITY CONTROL BOARD, LOS ANGELES REGION

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3 Date: _____

By: _____
Executive Officer

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5 APPROVED AS TO FORM:

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7 _____
Attorney for the Regional Water Quality
8 Control Board, Los Angeles Region
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1 REGIONAL WATER QUALITY CONTROL BOARD, SANTA ANA REGION

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3 Date: _____

By: _____
Executive Officer

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5 APPROVED AS TO FORM:

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7 _____
8 Attorney for the Regional Water Quality
9 Control Board, Santa Ana Region
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1 REGIONAL WATER QUALITY CONTROL BOARD, SAN DIEGO REGION

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3 Date: _____

By: _____
Executive Officer

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5 APPROVED AS TO FORM:

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7 _____
8 Attorney for the Regional Water Quality
9 Control Board, San Diego Region
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1 SOUTHERN CALIFORNIA COASTAL WATERS RESEARCH PROJECT, a joint powers agency

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3 Date: _____

By: _____

4 STEPHEN B. WEISBERG
5 Executive Director
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EXHIBIT A

SCOPE OF WORK FOR ESTABLISHING A SOUTHERN CALIFORNIA STORMWATER MONITORING/RESEARCH COOPERATIVE PROGRAM

PURPOSE

The PARTIES support the formation of a stormwater research/monitoring program in Southern California. The intent is to implement an initial five-year period of study with commitments to be established through subsequent funding and implementation agreements and/or federal, state, or organizational grants. The key focus of the research/monitoring program is to develop improved methodologies and assessment tools to more effectively understand urban municipal stormwater and non-stormwater (anthropogenic) impacts to receiving waters from a management perspective. These issues cross local political boundaries and agency jurisdictions thereby representing a need for PARTIES to interact cooperatively to resolve important stormwater-related problems at regional scales.

SCOPE OF WORK

This initial project entails the development and prioritization of a research agenda with the assistance of water quality/resource management/regulatory experts. The Southern California Coastal Water Research Project (SCCWRP) will coordinate this initial project. The research agenda shall be a list of proposed projects, designed by the water quality/resource management/regulatory experts, which shall form the focus of research/monitoring program for the collaborating stormwater discharge and regulating agencies in Southern California.

The scope of work will involve four main tasks. The first task is to assemble the panel of experts to design the research agenda. The panel of experts will be a diverse group of technical specialists in a variety of stormwater disciplines. The second task will be to convene the experts through a workshop format. The workshop will be preceded with a white paper that defines the research/monitoring needs of stormwater managers in Southern California. The third task will be detailing the research agenda produced by the expert panel. The research agenda will be documented in a draft report and shall include a technical prioritization of scientific projects, the technical tasks necessary to address each research project, a proposed schedule for implementing these research tasks, and estimated costs for each research project. The draft report shall also be submitted to the Steering Committee in an oral format. The fourth task incorporates comments from the draft and oral reports, and uses the Steering Committee to rank the research projects for management needs. It is this ranked research agenda by the Steering Committee that will become the research/monitoring focus over the next five years.

The following lists of research/monitoring topics are examples of the types of projects that need to be considered by the expert panel. If feasible, the expert panel should create a research/monitoring study design that will attempt to answer these management questions:

- a) *What are the most appropriate monitoring designs to assess stormwater discharges, potential water quality impacts, and the effectiveness of stormwater management programs?*

In Southern California, monitoring agencies have not adopted a unified study design or approach for either discharge or receiving water monitoring programs; a variety of monitoring designs are currently used. For example, most municipal programs employ either a land use design, a mass emissions design, or a combination of both to characterize stormwater discharges. Receiving water monitoring, BMP effectiveness, and source tracking programs are even more varied. This inconsistency is in large part due to the fact that monitoring objectives have not been clearly defined. In addition, little effort has been expended toward evaluating existing program designs or analyzing data on scales not specifically defined by NPDES permits (e.g., over multiple jurisdictions or regionwide). As such, the efforts that are undertaken have been disconnected and perhaps inefficient.

The expert panel should evaluate existing stormwater monitoring objectives as defined by federal regulations and NPDES permits, as well as the different stormwater monitoring designs that have evolved to address them. The panel should then recommend a project that will define (1) appropriate stormwater monitoring objectives, and (2) implementation strategies that are best for addressing these objectives and for assessing overall program effectiveness.

- b) *What standardized field and laboratory protocols are appropriate for urban stormwater monitoring in Southern California?*

With respect to marine monitoring, the standardization procedures implemented in the 1998 Southern California Bight Regional Monitoring Program allow more statistically valid comparability between sampling organizations, analytical laboratories, sampling strata, (e.g. river mouths vs. large POTW outfalls, bays and harbors vs. Channel Islands, etc.) and locations. This standardization of protocols has significantly increased the level of quality assurance in the region and has enabled rigorous evaluation of monitoring groups, including volunteer monitoring.

The expert panel should evaluate whether the urban stormwater permittees in Southern California could implement similar standardization procedures and identify a research project that includes development of consistent automatic sampling methods, inter-calibration exercises with multi-parameter probes, agreement upon uniform analytical methods and method detection limits, data evaluation techniques, etc.

- c) *Which toxicity tests should be used to evaluate the toxicity of urban pollutants of concern in the stormwater runoff of Southern California?*

No one organism is sensitive to all aquatic toxicants. *Ceriodaphnia* (freshwater zooplankton), fathead minnow, and *Selenastrum* (algae) are commonly used freshwater indicators. Mysids (marine zooplankton) and the sea urchin fertilization test are common

marine indicators. The 10-day amphipod survival test is used for evaluating marine sediment toxicity. There are questions regarding the precision and accuracy of some of these tests and the comprehensiveness of toxicity evaluation with respect to all constituents of concern. For example, for *Ceriodaphnia* the LC_{50} for diazinon is 450 ng/L, for fathead minnow 6,600,000 ng/L. Although Mysids are very sensitive to chlorpyrifos ($LC_{50} = 35$ ng/L) they are not sensitive to diazinon ($LC_{50} = 4500$ ng/L) at the concentrations that would be normally found in urban stormwater runoff. *Ceriodaphnia* on the other hand are sensitive to both diazinon and chlorpyrifos ($LC_{50} = 80$ ng/L).

The expert panel should evaluate the contaminants of concern and thresholds used to assess this concern. A search should then be conducted to determine if appropriate toxicity tests are available for each constituent on the list, specifying local species where applicable. The expert panel should identify a research project that evaluates new test methods/species that best assesses management needs. The expert panel should also identify a research project that evaluates the relationship between indicator toxicity test species and native fauna in the receiving waters.

- d) *Do dissolved heavy metals in stormwater runoff cause toxicity in receiving waters and how do we measure these forms of dissolved heavy metals?*

Concentrations of dissolved heavy metals have been used as indicators of impairment to inland receiving waters based upon a variety of water quality thresholds. There is a lack of agreement with the water quality threshold approach noting that some dissolved forms of metals are not toxic.

The expert panel should evaluate the aquatic toxicity of heavy metals and their relationship to water quality thresholds. A research project should be developed to determine the analytical procedures required to quantify the concentrations of toxic forms of dissolved metals, or alternatively, measure the complexing agents that reduce heavy metal toxicities.

- e) *What improvements can be made to current methodologies for identifying unknown toxicants in urban runoff, or are there alternative methodologies that can be developed?*

Recent work, such as that on San Diego Creek/Upper Newport Bay or Ballona Creek/Santa Monica Bay, have only identified a portion of the constituents responsible for toxicity in these watersheds. The identification of many other toxic constituents, or biological vectors, is not possible at this time due to a lack of appropriate and/or available methodologies. Current methodologies have been optimized for wastewater effluents that vary considerably from urban runoff.

The expert panel should evaluate the most effective TIE and other methodologies for urban runoff and identify research projects that improve TIE methods with stormwater matrix.

- f) *Can biological indicators be used to assess the health of inland surface and coastal waters in Southern California? Can biocriteria be developed?*

In other regions of the U.S. where natural streams have year-round, continuous flow, scientists can determine the health of streams by sampling, identifying and counting fish and aquatic insects. Indices of biological community health have been developed in these regions based upon the abundance of pollution tolerant organisms and pollution sensitive organisms, as well as relative measures of diversity. Biocriteria were established based upon these biological indices. In Southern California, many natural streams are ephemeral or are dominated by urban runoff or POTW discharges. Indices and biocriteria for this area have not been established, but could be a powerful management tool for assessing urban runoff impacts or developing TMDLs.

The expert panel should evaluate the biological index approach for the Southern California region and design a research project for developing the index and associated biocriteria.

- g) *How do the physical characteristics of urban stormwater discharges (e.g., flow rate, volume, temperature, etc.) affect the beneficial uses of receiving water bodies?*

The physical characteristics of urban stormwater discharges and their relationship to beneficial use impairment has received limited research, particularly in Southern California. This issue may be significant in Southern California where drainage channels are designed to transport the water as rapidly as possible to the receiving water in order to minimize flooding hazard. Moreover, many of these channels may be used for groundwater recharge, passive recreation, and/or may receive discharges upstream from inland POTWs and industrial facilities. Flow, volume and velocity all play roles in defining a receiving water's assimilative capacity. The effects of these components will impact TMDL development in the region.

The expert panel should evaluate the physical effects of stormwater flow and identify research projects that will improve understanding of its impacts upon receiving waters. At a minimum, the expert panel should include an examination of the potential trade-offs between flow rate and volume, flood protection, recreational uses, temperature, beach replenishment, dredging, stream morphology, erosion control, pollutant flushing, and assimilative capacity.

- h) *How can pollutant fate, transport and dispersion studies be used to evaluate transitory/intermittent stormwater impacts? Are there models that can be used or developed to help management efforts?*

The temporal and spatial distribution of impacts associated with stormwater discharges are not well understood in Southern California. Measurements of pollutant fate and transport within river systems, then subsequent plume dispersion and mixing in receiving waters has been accomplished in very few watersheds. Moreover, the episodic nature of stormwater discharges complicates these measurements since the predictability for unmeasured storm events and extrapolation to unmeasured watersheds is uncertain. These factors limit the utility of models previously developed in other regions of the country. An improved understanding of fate, transport and plume dynamics (both the dissolved and particulate

fractions) would immensely help managers by assessing the severity in space and time of these discharges.

The expert panel should evaluate the utility and broader applicability of fate, transport and dispersion studies. A research project should be identified that would help stormwater managers better understand the physical and dynamic processes that affect the transport and fates of stormwater-borne pollutants. The research project should include modeling these discharge parameters to allow the extrapolations needed by stormwater managers. Consideration should be given to integrating these models with those already developed within the region.

- i) *How can advances in information technology be used in monitoring, modeling and information exchange?*

Many satellite, computer, Internet and GIS tools are becoming widely available and could enhance conventional monitoring and data distribution approaches. Currently, the PARTIES do not share a common information management system and this limits data fusion and assimilation for comparing among programs or among watersheds. For example, coordinated BMP assessment across a wider range of sites could improve understanding of how well they work under a variety of conditions. Or, combining data from many more land use sites could significantly increase the accuracy of mass loading models. Several of these new information technologies can further enhance monitoring programs by capturing images previously unavailable (e.g. satellites), or providing an improved mechanism to present monitoring results in an easily understandable format (e.g. maps) that are available to a wide audience (e.g. internet). This has been accomplished for other monitoring programs such as the Santa Monica Bay Restoration Project's data exchange standards developed for surfzone bacteriological monitoring.

The expert panel should identify a research project that focuses on information management and information sharing among the PARTIES and others. In specific, monitoring reporting requirements should be considered. In addition, the expert panel should provide recommendations on how these new information technologies can be utilized to improve existing monitoring, analysis, and reporting efforts.

- j) *How effective are various BMPs for improving stormwater quality for particular parameters at local scales? Can sensitivity analysis be used to evaluate which BMPs are most efficient for improving stormwater quality at the watershed scale?*

Best management practices (BMPs) have been, and still are, being applied without regard to whether the change in stormwater quality will have any meaningful impact on beneficial use protection. Stormwater managers need to know which BMPs are most effective at reducing loads and concentrations for specific constituents. Next, managers need to assess the relative effectiveness of alternate BMP programs within a given watershed (i.e., which BMPs will provide the greatest improvement in stormwater quality at the most reasonable cost). Finally, there will need to be an evaluation if these expenditures on BMPs and improvement in

stormwater quality will promote beneficial use protection. This evaluation needs to include the improvement of stormwater relative to non-stormwater inputs.

The expert panel should describe a research program that addresses the relative effectiveness of alternate BMP programs in reducing loads and concentrations for specific constituents. In addition, the expert panel should consider which tools and indicators can be used, or need to be developed, in order to conduct the sensitivity analysis that will enable the assessments of BMP implementation efficiency.

- k) *What are the appropriate pathogens and/or pathogen indicators that should be measured in stormwater discharges? How do these measures relate to human health risk?*

Several studies have identified elevated levels of fecal indicator bacteria (coliforms and enterococcus) in recreational waters near storm drain discharges. At times, these levels exceed State water quality thresholds and result in beach warnings and closures. However, these indicator bacteria are not necessarily pathogenic, but are only indicators of the pathogens that might exist (e.g. virus). In fact, the microbial indicators can arise from non-human sources such as birds and other mammals. These non-human sources are not a large component of wastewater, but could potentially be a significant component in storm drain discharges. Moreover, where water quality thresholds have been developed, they have not always been developed based upon health risk. Finally, the premise that microbial indicators are a good surrogate for pathogens relies upon the assumption that the pathogens behave similarly in the receiving water environment. There has been very little research conducted to assess the survivability and transport of the pathogens, relative to the indicators, in storm drains or in receiving waters.

The expert panel should identify a research program that will address detection of pathogens in storm drain discharges, the relationship between pathogens and indicators, and define the health risk of swimming in waters with varying levels of storm drain influence.

- l) *What issues are not covered by this list? Are there additional questions of management concern in the Southern California Region?*

There are numerous questions that could be asked about stormwater impacts, and the needs of stormwater managers in the Southern California region. The expert panel should consider a list of additional questions, and establishment of research projects to address these questions, which have not been conceived thus far.

EXPERT PANEL

Membership By Discipline

The makeup of the expert panel should be designed by scientific discipline to ensure an adequate representation of the wide breadth of issues that face stormwater managers. This will also help to ensure the cross-fertilization necessary to address some of these issues. Moreover, a diversity

of opinions and viewpoints will likely improve the product. The list of scientific disciplines shall include:

- *Hydrologist/Civil Engineer*: Specialty in hydrological processes, specifically surface waters, flood control, sediment transport, structural and non-structural BMPs.
- *Water Quality Chemist*: Specialty in chemical measurements and analyses of surface water. Good knowledge of regulatory thresholds. Interested in addressing non-routine measurements or target analytes.
- *Public Health Specialist*: Strong background in public health risk assessment. Can identify the research needed to evaluate public health risk for water contact recreation, shellfish harvesting, or other beneficial uses.
- *Environmental Specialist*: Specialist in ecology and toxicology of receiving water environments such as rivers, creeks, wetlands, bays and/or oceans. Can evaluate the ecological risk assessment needs for stormwater inputs.
- *TMDL Specialist*: Someone who has background and experience in TMDL development. Cognizant of the regulatory requirements and practical necessities for conducting TMDLs.
- *Regulated Community Nominated Specialist / Environmental Advocacy Group Nominated Specialist*: Two individuals, one selected from each group, that have a strong technical background in stormwater science. Individuals must be capable of adding to the scientific and research goals of the panel.
- *Modeling Specialist*: Specialty in integrating environmental data into functional predictive models.
- *Information Specialist/Statistician*: Someone with experience in data management and designing monitoring programs for environmental managers.
- *Professional Facilitator*: Someone sufficiently knowledgeable with stormwater issues, but most importantly is capable of moving the group positively towards workshop goals.

Selection Process

There are likely numerous individuals that could fill each of these expert panel disciplines. The selection of the individual for each discipline shall follow a three-step process.

- SCCWRP will generate a list of three names for each of the proposed panel member disciplines. This list will be submitted to the PARTIES along with background information on each individual.

- The PARTIES will provide additional names to the list as necessary.
- SCCWRP will rank each of the candidates by discipline and provide the rankings to the Steering Committee for an approval by majority vote.

DELIVERABLES

There will be four deliverables under this Scope of Work. These include:

- *White paper.* This paper will summarize the recent historical background of stormwater impacts and management needs in southern California. This product will be used to set the stage for the expert panel, providing the necessary information to engage communication and identify the critical endpoints for the research agenda.
- *Expert Panel Workshop.* A three-day workshop shall be convened for the expert panel. The workshop shall be the primary mechanism to engage the panel members in designing the research program. Panel members may be asked for additional critical pieces of information following the workshop.
- *Draft Report.* SCCWRP shall produce a draft report summarizing the workshop findings and detailing the research agenda for the Steering Committee. The draft report shall include a list of research/monitoring projects, technical prioritization of these projects, a proposed schedule of implementation for each project, and estimated costs per project. Accompanying the draft report shall be a verbal presentation to the Steering Committee. The goal of the presentation is to gather consensus on which projects are of the greatest management need.
- *Final Report.* SCCWRP shall produce a final report 45 days after receiving comments from the Steering Committee. The Steering Committee will adopt the five-year research agenda.

TIMELINE

The total elapsed time for this project will be 7.5 months from contract signing as follows:

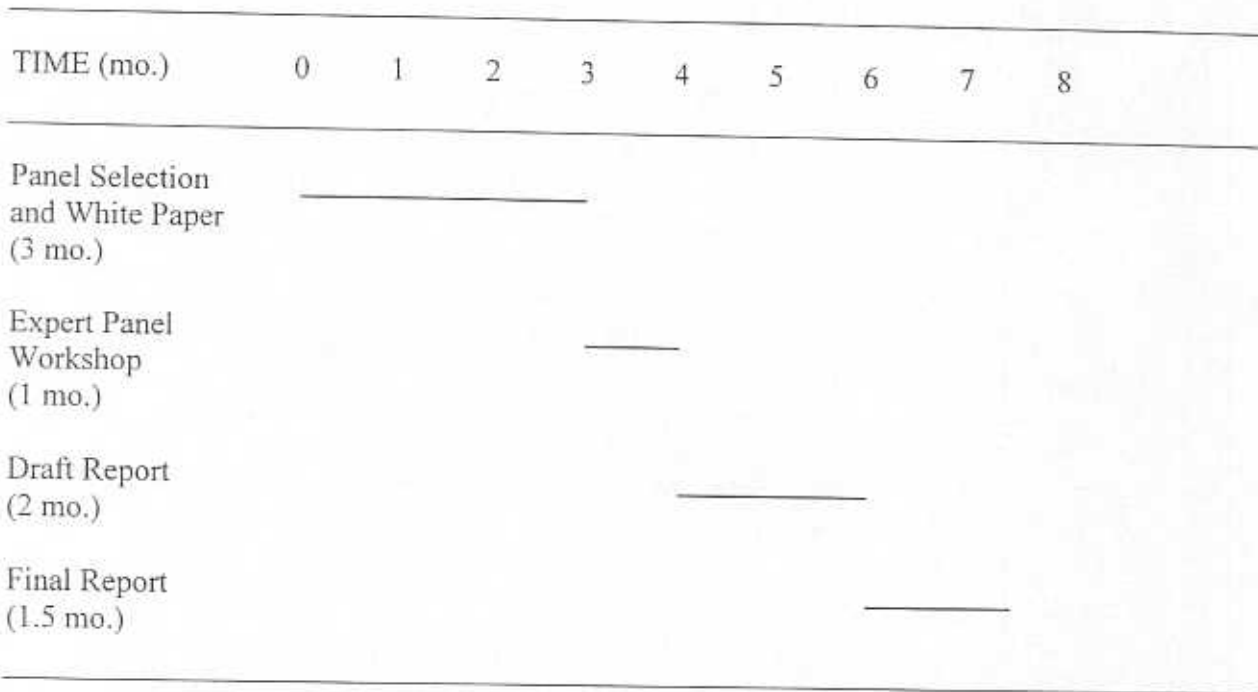


EXHIBIT B PROJECT COST ESTIMATES

Consultant Fees

Panel Membership	10 persons
Each member billing Rate	\$125/hr
3 Day Workshop + 2 Day Preparation & Follow-up	40 hrs
Travel and lodging	\$1000/person
TOTAL CONSULTANT FEE	\$60,000

Meeting Arrangements

Facility	\$4,500
Miscellaneous	\$500
TOTAL HOST FEE	\$5,000

Coordination and Product Output

Meeting Prep and Organizing/White paper			
Admin Asst.	\$35/hr	100 hrs	\$3,500
Principal Invest	\$74/hr	100 hrs	\$7,400
Facilitator	\$125	50 hrs	\$6,250
Preparation of Meeting Output/Follow-up/Draft Report			
Admin Asst.	\$35/hr	50 hrs	\$1,750
Res. Tech.	\$39/hr	100 hrs	\$3,900
Principal Invest	\$74/hr	100 hrs	\$7,400
Facilitator	\$125/hr	60 hrs	\$7,500
Oral Report/Final Report with Recommendations			
Res. Tech.	\$39/hr	40 hrs	\$1,560
Principal Invest	\$74/hr	80 hrs	\$5,920
SUBTOTAL LABOR			\$45,180
Printing, Materials, and Mailing Fees			\$1,360
TOTAL COORDINATION FEE			\$46,540
Subtotal Total Project Cost			\$111,540
Addition to or departure from Original Scope of Work	10%		\$11,154
TOTAL PROJECT COST			\$122,694

MONETARY DISTRIBUTION AMONG PARTIES

The monetary obligation of this project shall be distributed equally among eight of the PARTIES as follows:

Orange County Public Facilities and Resources Department	\$ 15,336.75
San Bernardino County Flood Control District	\$ 15,336.75
Riverside County Flood Control and Water Conservation District	\$ 15,336.75
San Diego County Department of Environmental Health	\$ 15,336.75
Southern California Coastal Water Research Project	\$ 15,336.75
City of Long Beach	\$ 15,336.75
County of Los Angeles Department of Public Works	\$ 15,336.75
County of Ventura Flood Control District	\$ 15,336.75
TOTAL CONTRIBUTION	\$ 122,694.00